

REMARKS

Claims 1, 4, 6, 14, 15 and 17 are currently amended and no claims have been added or canceled by way of this response. Thus, claims 1-18 are currently pending and presented for examination. Applicants respectfully request reconsideration and allowance of the pending claims in view of the foregoing amendments and the following remarks.

Response to Rejections Under Section 112:

Claims 4, 14 and 17 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention. Applicants appreciate the Examiners careful examination and reading of the claims. Applicants have amended claims 1, 4, 6, 14, 15 and 17 in response to the section 112 rejections to resolve the indefiniteness issues.

In light of the above amendments, Applicants respectfully request the Examiner withdraw the section 112, second paragraph rejections. No new search or consideration is necessitated by these amendments.

Response to Rejections Under Section 103:

Claims 1-3, 5-13, 15-16 and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Rossmann (USPN 5,474,421) in view of Popp (USPN 4,659,282) and further in view of Namura (USPN 5,498,136).

In the instant Office Action, the Examiner contends that the combination of Rossmann in view of Popp and further in view of Namura teaches Applicant's claimed invention. Applicants respectfully disagree.

Applicant's claim 1 recites in part:

**...a titanium alloy blade ... and
a support element arranged between adjacent blades of the blade
row located approximately in the blade center region and
coupling the adjacent blades.**

Applicant's claim 6 recites in part:

... wherein the **first and second blades are formed from a titanium alloy**; and
a **support element** located between the first rotating blade and the second rotating blade and **arranged approximately in the blade center region**, and adapted to couple the first rotating blade to the second rotating blade ...

Applicant's claim 15 recites in part:

... installing a **support element** between the first rotating blade and the second rotating blade, the **support element located approximately in the blade center region**;
coupling the first rotating blade to the second rotating blade; and
...
wherein the **first and second blades are formed from a titanium alloy**.

Specifically, the Examiner contends that Rossman teaches Applicants claimed invention except for the blade being made of titanium and a support element arranged between adjacent blades of the blade row located approximately in the blade center region and coupling the adjacent blades.

Applicants respectfully disagree with the Examiners contention and respectfully submit that MPEP 2143.01 V states:

If proposed modification would render the prior art invention being modified **unsatisfactory for its intended purpose**, then **there is no suggestion or motivation to make the proposed modification**. [emphasis added]

The purpose of the invention of Rossman is to increase the life of turbine rotor disks, blades and bladed rotor disks by reducing the overall weight of the blades that the disk must support. [col. 1, lines 57-67]. Rossman achieves its objective by reducing the overall weight of the blades that the disk must support by forming a blade row of a series of alternating heavy weight and light weight blades, where the heavy weight blades are metallic and the light weight blades are ceramic (Abstract and col. 6, lines 32-44). Rossman teaches that the light weight blades are brittle and do not exhibit sufficient impact resistance to safely operate on their own. Rossman therefore braces the light weight blades with adjacent heavier metallic blades to form a blade row comprised of light but brittle blades alternated with heavy but strong blades. [col. 3,

lines 5-23]. Rossman further discloses that the light weight blades can be made of a ceramic material, specifically silicon carbide or silicon nitride [col. 6, lines 32-44].

In the instant Office Action, the Examiner contends that, in view of Popp which teaches titanium turbine compressor blades, all of the blades of Rossman should be titanium stating that the motivation is to provide low weight and high strength. However, one of ordinary skill in the art of material science readily appreciates that a titanium alloy suitable for use in a gas turbine engine weighs approximately 34% more than the silicone carbide ceramic taught by Rossman, therefore having all the blades made of titanium would result in an increase in total blade weight as compared to the metallic and ceramic combination taught by Rossman. In other words, while there would be a motivation to replace the heavy nickel or cobalt super alloy blades with titanium, there is no motivation to replace the extremely light ceramic blades with heavier titanium. Therefore, there is no motivation to modify Rossman with Popp as contended by the Examiner, since it would destroy the desired functionality of Rossman's device. However, a fair reading of Rossman in view of Popp would suggest replacing the heavy nickel or cobalt blades with titanium and would yield a blade row of alternating titanium and ceramic blades, while bracing the ceramic blades at the blade tip against the adjacent titanium blades for impact reinforcement. Furthermore, the addition of Namura would add upper and lower connecting wires that join adjacent blades together just above and below a radial mid section to tie the blades together in a ring as taught by Namura in figures 6, 8 and 9.

However, the above combination does not teach Applicants claimed invention. Specifically, claims 1, 6 and 15 recite a blade ring of **titanium alloy blades** coupled to each other by a **supporting element** arranged essentially in a **blade center region**. This is **not alternating heavy/light metallic/composite blades with shrouds at the blade tips and upper and lower connecting wires that join adjacent blades together just above and below a radial mid section to tie the blades together in a ring**.

In light of the above, Applicant's respectfully submit that the teachings of Rossman in view of Popp and further in view of Namura do not teach or suggest Applicant's claimed invention, and therefore the Examiner has failed to establish a prima facie case of obviousness. Therefore, claims 1, 6 and 15 are patentable as well as claims 2-5, 7-14 and 16-18 at least based on their dependence from claims 1, 6 or 15 as well as on their own merits. Therefore, Applicants

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request the Examiner withdraw the section 103 rejections and timely pass the application to allowance.

Conclusion

For the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding Office Action are inapplicable to the present claims. Accordingly, Applicants respectfully request that the Examiner reconsider the rejections and timely pass the application to allowance. All correspondence should continue to be directed to our below-listed address. Please grant any extensions of time required to enter this paper. The commissioner is hereby authorized to charge any appropriate fees due in connection with this paper or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

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